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# Monetary cooperation perspective in Central Asia

Jasur Karshibaev*

*Graduate School of Economics, Kyushu University, 6-19-1 Hakozaki, Higashi-ku Fukuoka 812-8581, Japan*

**Abstract**

Recent global economic and financial crisis and exchange rate volatilities in Eurasian countries caused significant impact on exchange arrangements and trade flows in Central Asian economies and thereby unveiled the necessity of monetary cooperation in the region. For this, current paper proposes a deviation measurement for coordinated exchange rate policies in Central Asian countries to enhance the regional monetary cooperation. Central Asian Currency Unit - CACU is calculated as a weighted average of Central Asian currencies against USD following the method used to calculate the European Currency Unit (ECU) and the Asian Monetary Unit (AMU) introduced by Ogawa and Shimizu (2005) for East Asian countries; and indicator that displays the degree of deviation of Central Asian currencies against CACU at the benchmark rate. Three types of CACU are considered in the paper based on nominal GDP, GDP measured at PPP and trade volume, while deviation indicator is grounded on arithmetic average of GDP at PPP and trade volume shares.

Findings indicate that Central Asian currencies significantly deviate in terms of other Central Asian currencies. Furthermore, nominal and real deviation indicators signal that the trends vary in both the scales and directions. Thus, these measurements can be utilized for enhancing coordinated exchange rate policies among Central Asia.



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*Keywords:* Exchange arrangements; exchange rates; monetary policy frameworks; monetary cooperation; Central Asia

## 1. Introduction

Central Asian region encompasses Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, which have common past of experiencing planned economy, but vary on available natural resources and development paths. Kazakhstan has the largest territory in the region and vast oil reserves. Uzbekistan is the mostly populated country in

* Corresponding author. Tel.: +81-90-8402-0055
*E-mail address:* karshibaev@gmail.com


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Central Asia with abundant natural resources. There are considerable reserves of natural gas in Turkmenistan; and Tajikistan and Kyrgyzstan have substantial water resources.

Karshibaev (2014a) revealed two dissimilar development paths in the region: Commodity export based development (Kazakhstan) and Export oriented industrialization (Uzbekistan). Accordingly, paths of these countries in international financial trilemma specified contrasting trajectories due to unlike policy priorities between capital mobility, exchange rate stability and monetary policy autonomy: Kazakhstan prioritized higher capital mobility and monetary policy autonomy, while Uzbekistan pursued limited capital mobility and exchange rate stability (Karshibaev, 2014b). However, since the global economic and financial crisis Kazakhstan changed its priority towards industrialization aimed at economic diversification. Accordingly, pegged form of exchange arrangement was introduced in Kazakhstan.

Recent developments indicate to significant exchange rate depreciation trends in most Central Asian countries (CAC) and in Russia that have negative impact on bilateral trade flows. In order to enhance regional monetary cooperation, the paper introduces Central Asian Currency Unit - CACU which is calculated as a weighted average of Central Asian currencies following the method used to calculate the European Currency Unit (ECU), and the Asian Monetary Unit (AMU) introduced by Ogawa and Shimizu (2005) for East Asian countries, and deviation indicators that display the degree of deviation of Central Asian currencies against CACU at the benchmark rate. Three types of CACU are considered based on nominal GDP, GDP measured at PPP and trade volume. Deviation indicators are calculated based on arithmetic average of GDP at PPP and trade volume weights.

Following Ogawa and Shimizu (2005) that introduced AMU and AMU Deviation Indicators for East Asian currencies, this paper presents estimated CACU and CACU Nominal and Real Deviation Indicators against USD and each of Central Asian currencies on a monthly basis as a primary attempt to explore indicators to enhance the monetary cooperation in the region. Further investigation of modified indicators that include key trading partners of Central Asian countries such as Russia and China will be a subject of future studies.

## 2. Exchange arrangements in Central Asian countries

Central Asian countries announced independence in 1991 and national currencies were introduced in 1993-1995. Further currency reforms occurred in Tajikistan (2000) and Turkmenistan (2009). All countries, except Turkmenistan, accepted the obligations of Article VIII (IMF Articles of Agreement): Kyrgyzstan and Kazakhstan in the middle of 1990s, Uzbekistan and Tajikistan in the first half of 2000s (IMF, 1996-2014). In CAC, primarily exchange rate is determined against USD due to its role in countries' foreign trade. For instance, in Uzbekistan 95% of all foreign trade transactions in 2013 were done in USD (CBU, 2014). All CAC, except Turkmenistan, adopted flexible exchange arrangements up to the mid-2000s, when countries shifted towards pegged forms (IMF, 1996-2014). In Kazakhstan, Kyrgyzstan and Tajikistan, this shift is associated with global financial crisis since 2007. However, Kyrgyzstan returned to initial point shortly. On the other hand, in Uzbekistan, pegged exchange arrangement has been introduced in 2006 with the view to pursue export oriented development and macroeconomic stability.

Exchange arrangements in Kazakhstan are commonly driven by macroeconomic circumstances (NBK, 2000-2013). As a rule, National bank of Kazakhstan pursues price level stability, which was officially established in national legislation since 2004. NBK intervenes exchange market to smoothen significant fluctuations. Consequently, exchange rates underwent gradual fluctuation, except post-financial crisis periods with abrupt devaluations to improve current account balance and trade competitiveness (Fig. 1a). Alternatively, exchange arrangements in Uzbekistan were determined based on priorities of export stimulation policy and currency stability. Gradual depreciation of national currency under limited capital mobility allowed improving competitiveness of national export preventing significant fluctuations of exchange rate (Fig. 1e). During global financial crisis, depreciation of nominal exchange rates in Uzbekistan occurred with larger scopes varying from 7.9 % to 11% in 2008-2011 (CBU, 2006-2014). Exchange arrangements and monetary policies in Kyrgyzstan and Tajikistan are based on programs developed in cooperation with IMF. More liberalized financial system and macroeconomic circumstances in Kyrgyzstan led to adopting more flexible exchange rate arrangements, prioritizing price stability. Fig. 1b indicates that depreciation trend of Kyrgyz Som also strengthened during financial crisis. In Tajikistan, financial stability, low inflation, de-dollarization and currency stability priorities have been pursued taking into account international reserves (NBT, 2000-2012). However, during the global financial crisis, dramatic depreciation of exchange rates was observed in Tajikistan (Fig. 1c). In

contrast, exchange arrangements and exchange rates in Turkmenistan underwent little change with abrupt devaluation in post-crisis period (Fig. 1d). Exchange rate under adopted conventional pegged regime has been supported with significant capital controls in Turkmenistan (IMF, 1996-2014).

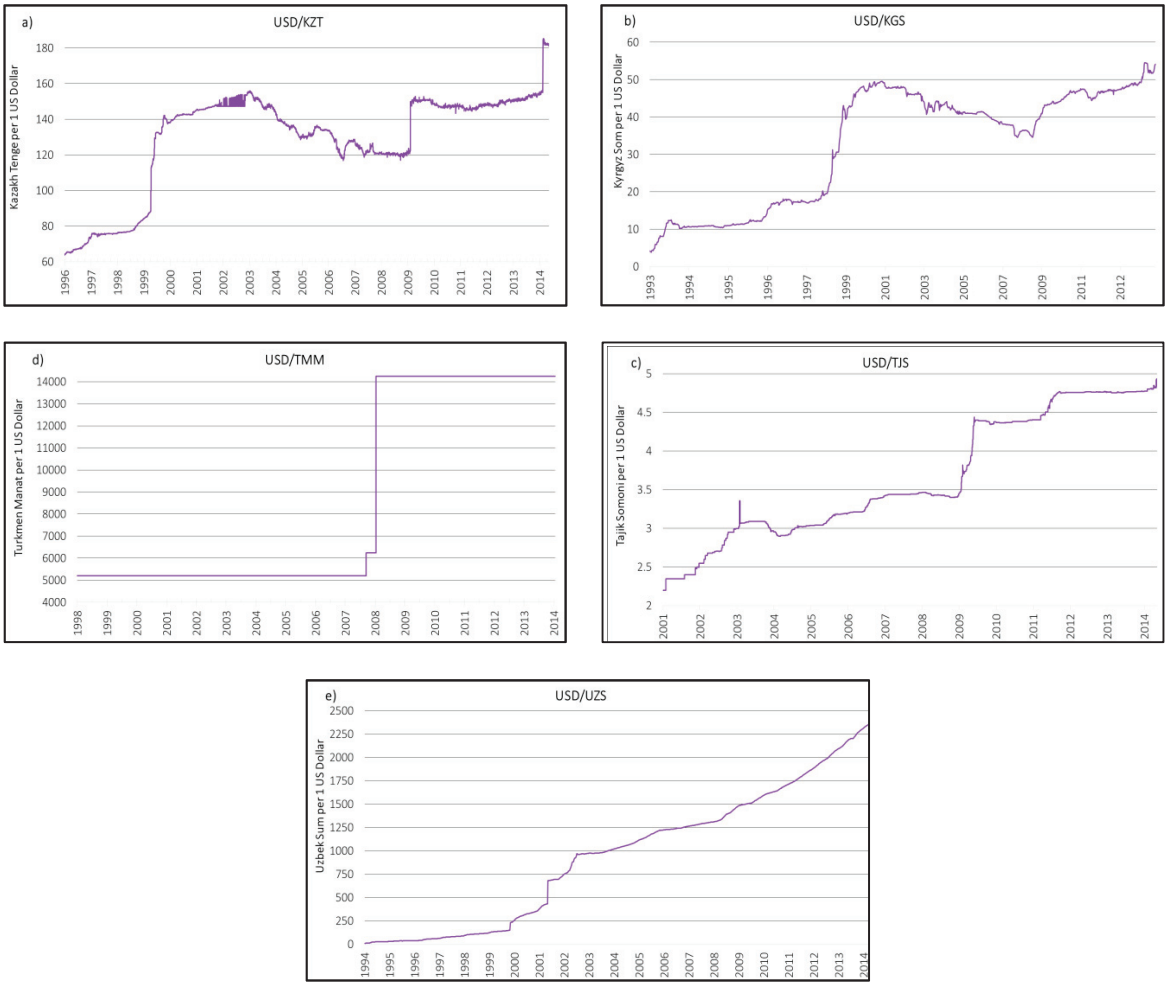


Fig. 1. Nominal exchange rates of Central Asian currencies against USD.

Fig. 2 presents real effective exchange rates (REER) in CAC. It points to substantial depreciation of REER in Uzbekistan in late 1990s along with financial liberalization process in early 2000s. These measures and REER stability in subsequent years corresponded to export oriented development strategy in Uzbekistan. Meanwhile, REER in Kyrgyzstan and Kazakhstan demonstrated parallel trends: significant depreciations after Russian financial crisis in 1998 led to REER decline in these countries with gradual recovering up to 2008, and declining in 2009 caused by abrupt nominal exchange rate devaluations (Fig. 2). REER in Turkmenistan appreciated up to late 1990s followed with gradual depreciation afterwards. Abrupt devaluation of nominal exchange rates in 2009 led to substantial undervaluation of Turkmen Manat REER since 2009. REER of Tajik Somoni underwent considerable fluctuations in early stages with stabilizing in 2000s.

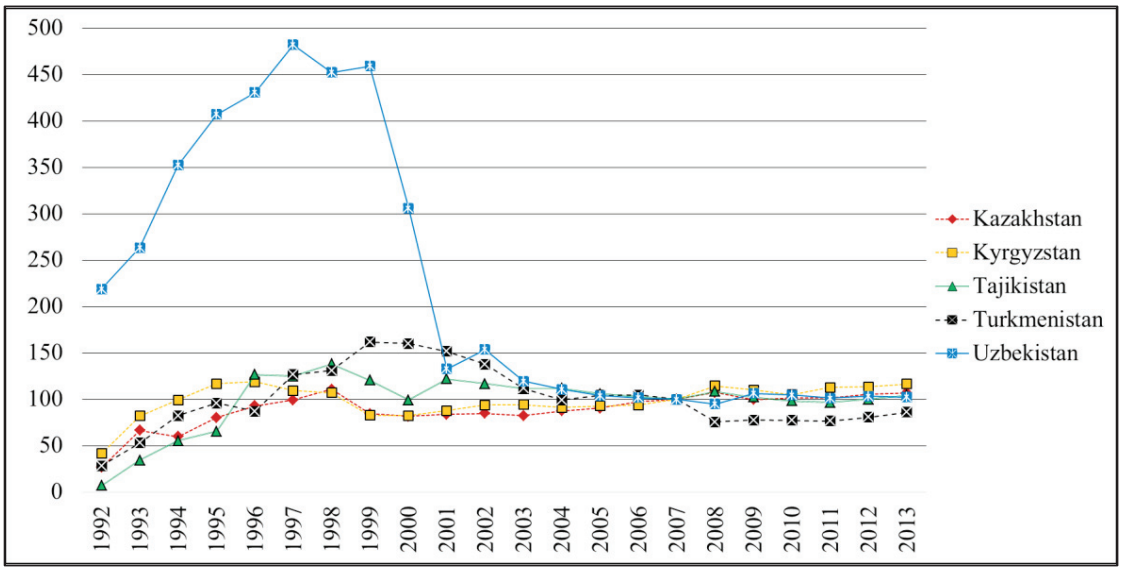


Fig. 2. Real Effective Exchange Rates in CAC, benchmark year 2007.

Thus, CAC differed both in exchange arrangements and in developments in nominal exchange rates. Recent developments indicate that most CAC adopted pegged exchanged arrangements in second half of 2000s in view of global imbalance, however, dissimilar trends in nominal exchange rates are observed. At the time when Kazakhstan, Kyrgyzstan, Tajikistan and Turkmenistan abruptly depreciated exchange rates of national currencies against USD in unlike manner and scales, Uzbekistan continued strategy of gradual depreciation. Consequently, these developments indicates to coordination lacking in exchange rate policies among Central Asian countries, which is to be monitored and considered in details in view of potential biased change in exchange rates among the intra-regional currencies.

## 3. Calculating the value of the CACU

For the calculation of CACU, five component currencies of Central Asian countries are chosen. Consequently, CACU compose of Kazakh Tenge (KZT), Kyrgyz Som (KGS), Tajik Somoni (TJS), Turkmen Manat (TMT) and Uzbek Sum (UZS). The weight of each currency in the basket is based on the respective share in regional GDP at PPP and their trade volumes. In view of currency reforms in CAC, the sample period covers from January 2001 to December 2014.

The CACU is estimated according to the method of calculating the ECU under the European Monetary System and the AMU introduced in Ogawa and Shimizu (2005). ECU and AMU were defined as a basket of currencies of the EU and ASEAN+3 countries respectively. A share of each currency in the basket was based on the combination of GDP (at PPP) and trade volumes of the country. Representative market exchange rates for the USD, as reported by member countries, were used to calculate an ECU equivalent, both in USD and in the currencies of the countries. The basket of USD-EUR was used for the calculation of AMU. In view of the fact that absolute portion of foreign trade transactions in CAC with their partner countries are conducted in USD and exchange rates are pegged to and determined against USD, CACU is also grounded on CAC exchange rates against USD.

In this paper, three types of economic size indicators are considered to determine the CAC currencies' weights in CACU:

- (1) Trade volumes
- (2) Nominal GDP
- (3) GDP measured at Purchasing Power Parity (PPP)

The trade volumes are based on the data on export and import from UNCTAD Statistics. Nominal GDP and GDP measured at PPP based on World Bank Dataset. Nominal exchange rates are sourced from corresponding central banks, OANDA and IMF.

In view of different GDP growth rates in Central Asian countries, the weights in CACU are calculated with reference periods 2001 and 2011 (Table 1).

Table 1. CACU weights based on different economic size indicators.

| Indicators | Year | Kazakhstan | Kyrgyzstan | Tajikistan | Turkmenistan | Uzbekistan |
|---|---|---|---|---|---|---|
| Trade volume, % | 2001 | 0.5256 | 0.0288 | 0.0396 | 0.2731 | 0.1329 |
| | 2011 | 0.6427 | 0.0385 | 0.0273 | 0.1577 | 0.1338 |
| Nominal GDP, % | 2001 | 0.5581 | 0.0384 | 0.0272 | 0.0890 | 0.2872 |
| | 2011 | 0.6830 | 0.0225 | 0.0237 | 0.1062 | 0.1646 |
| GDP at PPP, % | 2001 | 0.6042 | 0.0394 | 0.0298 | 0.0926 | 0.2339 |
| | 2011 | 0.6089 | 0.0285 | 0.0306 | 0.1027 | 0.2292 |
| Exchange rates (USD/CAC currency) | 2001 | 0.0068 | 0.0206 | 0.4206 | 0.0002 | 0.0023 |
| | 2011 | 0.0068 | 0.0217 | 0.2163 | 0.0001 | 0.0006 |
| | | | CACU weights | | | |
| Trade volume based | 2001 | 0.7701 | 0.0139 | 0.0009 | 14.2020 | 0.5687 |
| | 2011 | 0.9417 | 0.0177 | 0.0013 | 22.4730 | 2.3021 |
| Nominal GDP based | 2001 | 0.8177 | 0.0186 | 0.0006 | 4.6305 | 1.2288 |
| | 2011 | 1.0008 | 0.0104 | 0.0011 | 15.1302 | 2.8330 |
| GDP at PPP based | 2001 | 0.8854 | 0.0191 | 0.0007 | 4.8159 | 1.0008 |
| | 2011 | 0.8923 | 0.0131 | 0.0014 | 14.6376 | 3.9447 |

Indicators of CACU weights shows that in terms of trade volumes Kazakh Tenge has the biggest share (0.53) in 2001, which continued to grow in following reference periods (0.64 in 2011). The share of Turkmen Manat notably decreased in 2001-2011 from 0.27 to 0.16, while share of Uzbek Sum remained 0.13. The shares of Kyrgyz Som and Tajik Somoni changed insignificantly from 0.03 to 0.04 and from 0.04 to 0.03 accordingly. The significant increase of trade volumes in Kazakhstan are associated mainly with lion share of oil in national export (72% in 2011) and oil prices upsurge. In terms of Nominal GDP and GDP at PPP, the absolute major shares also belong to Kazakhstan followed by Uzbekistan and Turkmenistan, while Kyrgyzstan and Tajikistan have lesser weights. The lower part of the Table 1 presents the CACU weights calculated for three types of economic indicators in different reference periods.

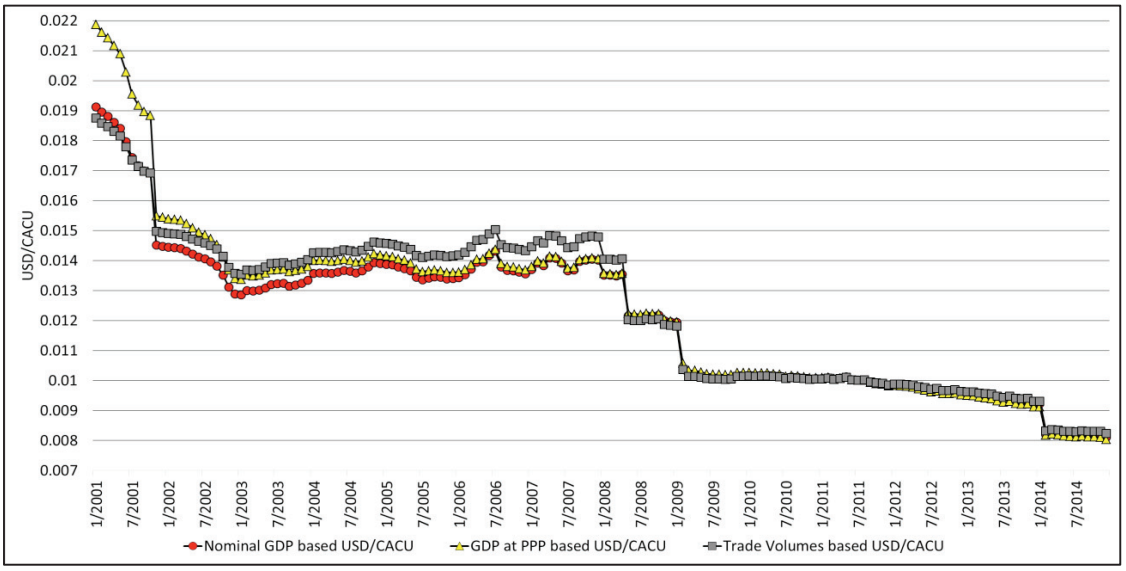


Fig. 3. Estimated CACU against USD based on trade volumes, nominal GDP and GDP at PPP in 2011.

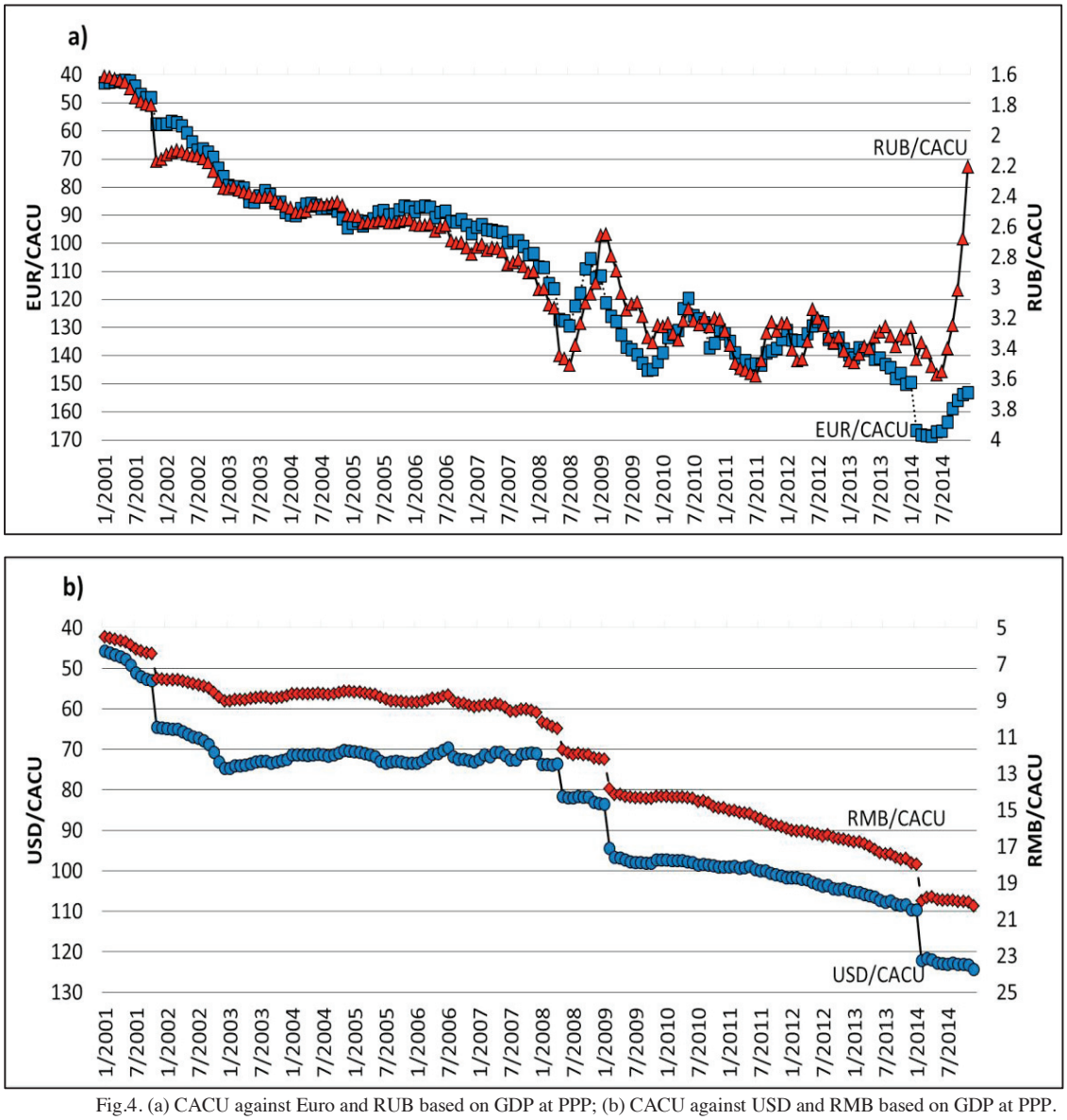


Fig.4. (a) CACU against Euro and RUB based on GDP at PPP; (b) CACU against USD and RMB based on GDP at PPP.

Choosing the most suitable type of currency unit is mainly determined by the level of its stability. In order to choose the most stable CACU against USD from observed types based on trade volumes, nominal GDP and GDP at PPP, comparison is required. Fig. 3 presents the estimated CACU against USD based on trade volumes, nominal GDP and GDP at PPP. It shows that all estimated USD/CACU trends concur. Furthermore, all the estimated USD/CACU displayed high volatility over 20% (Table 2). However, the shares in terms of GDP at PPP are more stable in comparison with shares in nominal GDP.

In view of significant weight of KZT in estimating CACU, dynamics of USD/KZT substantially effected and reflected in USD/CACU based on all economic size indicators. Thus, significant appreciation of KZT in early 2000s and abrupt devaluations in 2009 and 2014 determined corresponding developments in USD/CACU. Furthermore, shift from flexible to pegged exchange arrangement in USD/KZT in the second half of 2000s also resulted in stabilization of USD/CACU, at the time when gradual depreciation of USD/UZS can also be observed in the dynamics of

USD/CACU. The effect of USD/TMT devaluation is revealed in USD/CACU dynamics in 2008, especially in terms of CACU estimated based on trade volumes, where the TMT has a larger weight.

Table 2. Deviation indicators.

| | CH_GDP | CH_GDP_PPP | CH_TRADE |
|---|---|---|---|
| Mean | -0.004910 | -0.005736 | -0.004695 |
| Maximum | 0.020823 | 0.018419 | 0.018958 |
| Minimum | -0.141980 | -0.177441 | -0.144567 |
| Std. Dev. | 0.020287 | 0.020922 | 0.020276 |

Fig. 4 presents estimated CACU against USD, Euro, Russian Ruble (RUB), and Chinese Yuan (RMB) based on GDP at PPP. It shows that RUB/CACU gradually appreciated against CAC currencies (CACU) in early 2000s, while global financial imbalances in the second half of 2000s resulted in significant fluctuations. Since 2008, at the time when CAC prioritized exchange rates stability during the global economic and financial crisis, USD/RUB significantly depreciated and thereby CACU strengthened against RUB. However, following abrupt depreciation of KZT, KGS, and TJS in 2009 resulted in recovering of RUB/CACU. However, recent substantial depreciation of RUB against USD and Euro predetermined abrupt CACU strengthened against RUB in 2014. EUR/CACU underwent similar changes in observed period reflecting USD/EUR dynamics.

Stability of USD/CACU and RMB/CACU resulted due to the stability of USD/RMB and USD against CAC currencies. However, all the depreciations of CAC currencies against USD reflected in RMB/CACU accordingly.

## 4. Nominal and real deviation indicators of CAC currencies against CACU

Nominal deviation indicators are to be estimated based arithmetic average of CACU grounded on GDP at PPP and trade volumes weights. Furthermore, the nominal deviation indicators are estimated based on two benchmark rates in 2001 and in 2011 (Table 3). Originally, the benchmark rate is to be set at the rate where trade volumes balance (trade balance is minimal in CAC foreign trade in 2001), therefore benchmark rate 2001 is used to indicate developments in longer periods. However, in view of recent financial liberalization in CAC, benchmark rate in 2011 is considered appropriate to display the economic developments in view of recent changes.

Table 3. Indicators for estimation of benchmark rates.

| | Kazakhstan | Kyrgyzstan | Tajikistan | Turkmenistan | Uzbekistan |
|---|---|---|---|---|---|
| Benchmark rate in 2001 | | | | | |
| Arithmetic shares | 0.5649 | 0.0341 | 0.0347 | 0.1829 | 0.1834 |
| Average exchange rates against USD in 2001 | 0.0068 | 0.0206 | 0.4206 | 0.0002 | 0.0023 |
| CACU weights | 0.8277 | 0.0165 | 0.0008 | 9.5089 | 0.7847 |
| Benchmark exchange rate CACU/CAC currency | 2.7035 | 0.8949 | 0.0438 | 96 | 7.7009 |
| Benchmark rate in 2011 | | | | | |
| Arithmetic shares | 0.6258 | 0.0335 | 0.0290 | 0.1302 | 0.1815 |
| Average exchange rates against USD in 2011 | 0.0068 | 0.0217 | 0.2163 | 0.0001 | 0.0006 |
| CACU weights | 0.9170 | 0.0154 | 0.0013 | 18.5553 | 3.1234 |
| Benchmark exchange rate CACU/CAC currency | 1.4656 | 0.4608 | 0.0462 | 143 | 17.2089 |

The data is in monthly basis and covers the period from January 2001 to December 2014. The benchmark rate is set as an average rate in benchmark years (2001 and 2011), therefore, even in benchmark periods the nominal deviation indicator differs from 0.

Nominal deviation indicator (NDI) and Real deviation indicator (RDI) are estimated based on following formulas:

$$\mathrm{NDI}(\%) = \frac{\text{actual rate of CACU / a currency - benchmark rate of CACU / a currency}}{\text{benchmark rate of CACU / a currency}}$$

$$RDI_i = NDI_i - (P_{CACU} - P_i)$$

$P_{CACU}$ and $P_i$ corresponds to average price in Central Asian countries and each observed country.

Table 4 present nominal deviation indicators for each of Central Asian currencies. It shows that in observed period with the benchmark year in 2001, Kazakh Tenge and Kyrgyz Som significantly appreciated in comparison with other CAC, at the time when Uzbek Sum and Turkmen Manat depreciated in significant scales. Tajik Somoni remained relatively stable. Accordingly, significant deviations are observed in Uzbek Sum and Turkmen Manat followed by Kazakh Tenge and Kyrgyz Som. However, given benchmark year in 2011, the deviations in Uzbek Sum rate are less in comparison with Kazakh Tenge, Kyrgyz Som and Turkmen Manat. The reason is mainly related with significant one-sided depreciation of Uzbek Sum in early 2000s in preparation of partial financial liberalization, while other CAC currencies underwent abrupt fluctuations against USD. The deviation rates of Kazakh Tenge and Kyrgyz Som increased as benchmark rate changes from 2001 to 2011 in view of impact of global financial turbulence in crisis periods when the depreciation rates notably increased.

Table 4. Deviation indicators for each of Central Asian currencies.

| | NDI_KGS | NDI_KZT | NDI_TJS | NDI_TMT | NDI_UZS |
|---|---|---|---|---|---|
| | | | 2001 | | |
| Mean | -38.84851 | -34.91082 | 0.903535 | 12.17902 | 104.8852 |
| Maximum | 11.15392 | 8.973962 | 14.15655 | 80.35854 | 165.1315 |
| Minimum | -53.01720 | -47.28040 | -13.70524 | -27.07204 | -13.23967 |
| Std. Dev. | 13.94471 | 13.28733 | 6.301611 | 35.36440 | 41.70022 |
| | | | 2011 | | |
| Mean | 18.74413 | 20.07058 | -4.482139 | -24.45277 | -8.315006 |
| Maximum | 115.8390 | 101.0252 | 8.063503 | 21.46289 | 18.64492 |
| Minimum | -8.768680 | -2.747692 | -18.31118 | -50.88649 | -61.17522 |
| Std. Dev. | 27.07787 | 24.51126 | 5.965266 | 23.81624 | 18.66062 |

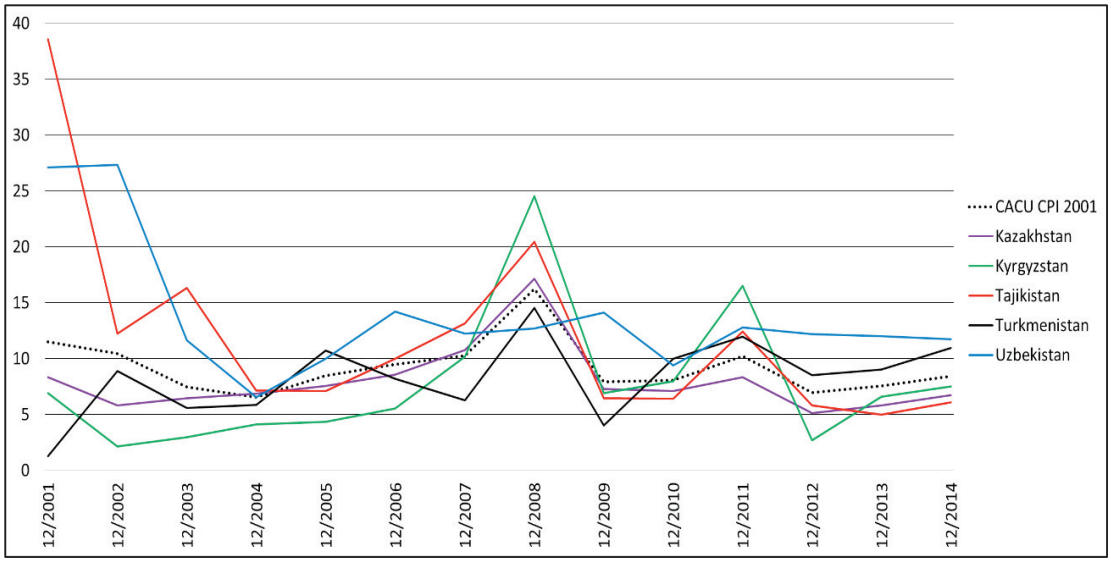


Fig. 5. Consumer price indices (average annual growth rates).

Fig. 6 displays the Nominal Deviation Indicators with three benchmark rates in 2001 and 2011. The trends indicate to dissimilarities in the development of exchange rates with significant level of deviations. Nominal deviation

indicators indicate to significant fluctuations of Central Asian currencies in the second half 2000s that concurred with global economic and financial crisis.

Deviation indicators with benchmark year 2001 corresponds to the approach adopted by Ogawa and Shimizu (2005), that is the balance between export and import transactions are minimal. In view of the fact that since 2001 all the CAC liberalized corresponding financial regulations, however, in different scale and manner, benchmark year 2011 is to display Central Asian currencies deviations in view of recent economic developments.


Fig.6. (a) Nominal Deviation Indicators, benchmark year 2001; (b) Nominal Deviation Indicators, benchmark year 2011.

Nominal deviation indicators with benchmark year 2011 indicates to gradual appreciation trends in KZT, KGS, TJS and TMT in view of on-going depreciation of UZS. However, abrupt devaluation of KZT in 2014 resulted in large fluctuations in other CAC currencies due to substantial KZT weight in CACU. However, consequent depreciations in of KGS, TJS and UZS brought to their recovery afterwards, while TMT demonstrated no change.

Most recent developments indicate that significant depreciation trends in major trading partner's (Russia) currency against CACU in 2014, no notable recovery process revealed yet, which had the negative impact on bilateral trade flows.

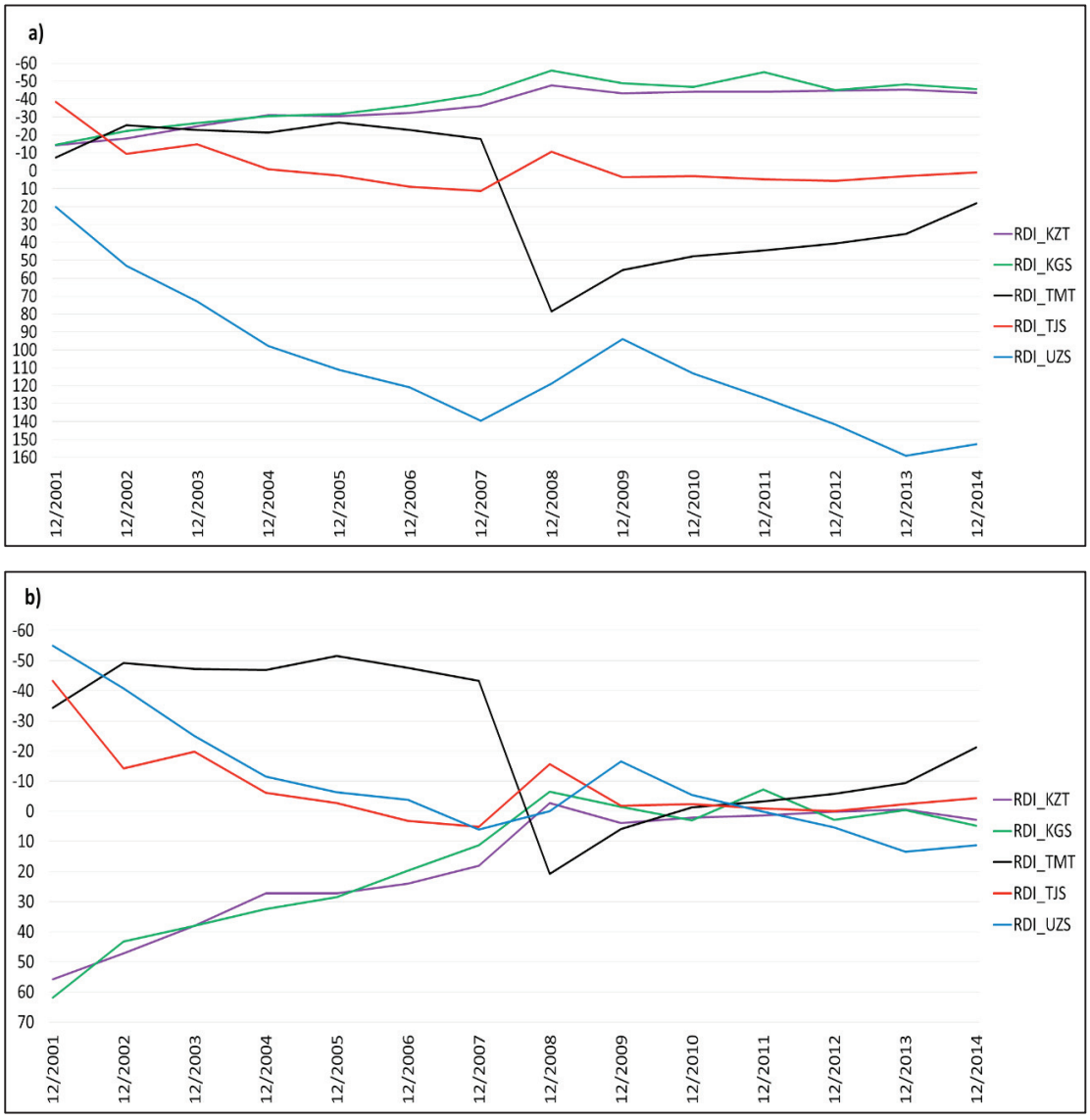


Fig.7. (a) Nominal Deviation Indicators, benchmark year 2001; (b) Nominal Deviation Indicators, benchmark year 2011.

Figure 7 displays calculated real deviation indicators with benchmark year in 2001 and 2011. It shows that Central Asian countries significantly differs not only on deviations in real terms. Particularly, at the time when Kazakhstan and Kyrgyzstan experienced appreciation against weighted average value of CACU, Turkmenistan and Uzbekistan underwent significant depreciation against CACU in real terms since 2001 (Figure 7a). Significant fluctuations are observed in the second half 2000s, when high inflation rates and abrupt devaluations occurred in most Central Asian countries. Most recent developments indicate that deviations continue in contrary directions indicating to the lack of monetary policy coherence in the region.

Thus, nominal and real deviation indicators show that Central Asian currencies demonstrated dissimilar developments and lacking of coordinated exchange rate policies.

## 5. Conclusion

In this paper, different types of Central Asian currency Unit (CACU) are estimated based on GDP at PPP and trade volume weights with the view to construct CACU Nominal and Real Deviation Indicators that can serve to enhance regional monetary cooperation in order to stabilize exchange rates in terms of weighted average of CAC currencies.

Findings indicate that Central Asian currencies significantly deviate in terms of weighted average rate of CAC currencies. Furthermore, nominal deviation indicators signal that the trends vary both in the scales and in directions. Real deviation indicators also revealed notable deviations in the region. However, future studies are to consider relationship between CACU and real effective exchange rates, particularly, basket of currencies based on shares of external main trade partners' of CAC, such as Russia, EU countries and China.

Thus, CACU and CACU deviation indicators can display the scales of Central Asian currencies deviation from the CACU. Therefore, these measurements can serve for the active surveillance process in order to make coordinated exchange rate policies among Central Asian countries.

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International Monetary Fund, http://www.imf.org/.
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